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Office Procedural Skills in Family Medicine

Larry G. Heikes, M.D., Ph.D., and Craig L. Gjerde, Ph.D.

Abstract—In a study of 131 residents, 34 faculty members, and 236 graduates at nine family practice residency programs in Iowa, 29 office and outpatient procedural skills (for example, repair of lacerations) were identified as representing the ideal core content for family practice residency training, and another 11 procedures (for example, endometrial biopsy) were identified as elective procedures. The faculty members' responses that residents were taught these 40 procedures by direct supervision were much higher than third-year residents' reports of having been supervised while performing them. There was a positive relationship between the percentage of residents who reported having been supervised and the percentage who felt competent to perform the procedures. There was strong agreement among faculty members, residency graduates, and the residents that residents should be evaluated by direct observation of their performance of both core and noncore procedures. Therefore, the view that evaluation by direct observation would be resisted by residents is not supported by this study. As a result of these findings, the authors encourage programs to establish processes for assessing and documenting residents' performances of office and outpatient procedures.

All residency programs should have as their goal the training of competent physicians. To help assure competency, it is useful to define a set of performance criteria for residents within the specialty. These criteria can be used as guides for evaluation and, as a result, for curriculum revision.

In an effort to improve the training and evaluation of office and outpatient procedures in family practice, the authors undertook the present study for the following reasons: (*a*) to develop a list of office procedures in which graduating residents should be proficient, (*b*) to assess the degree of competency residents feel they have in office procedures, (*c*) to determine the extent to which residents are supervised in their performance of office procedures, and (*d*) to determine the attitudes of faculty members, residency program graduates, and residents regarding the need for direct supervision and evaluation of a resident's performance of office procedures.

Since there are regional differences in the practice of family medicine and since the present study pertains to residents, faculty members, and graduates of family practice programs in Iowa, the findings may not be generalizable to other regions or states.

Dr. Heikes, who completed the research project reported here while a resident at the University of Iowa Hospitals and Clinics, is now in private practice in Centerville, Iowa. Dr. Gjerde is associate professor of family practice and educational consultant in the Office of Consultation and Research in Medical Education at the University of Iowa College of Medicine, Iowa City.

Background

In family practice, as in other primary care specialties, the abilities of a physician can be categorized into three areas: (*a*) attitudes and interpersonal skills—the behavior and ethics of the profession that are necessary for communicating and working with the patient, the patient's family, and other health care personnel; (*b*) intellectual faculties and abilities—cognitive knowledge, ability to organize and to synthesize, and clinical judgment necessary for medical problem-solving; and (*c*) motor and technical skills—the manual skills required to conduct a physical examination and to perform necessary procedures.

Procedural skills should be demonstrated to the resident and evaluated by direct observation of the performance of these skills. A minimal set of 39 procedural skills (both inpatient and outpatient) has been defined by the American Board of Family Practice (1). This board has charged residency programs with developing methods for documenting achievement of these procedures. The Family Practice Residency Assistance Program, which represents both the American Academy of Family Physicians and the American Board of Family Practice, was established to aid in the development of excellence in residency training programs in family practice. Although the program lists curriculum content requirements and recommends the evaluation of residents and the documentation of their experiences, it mentions procedural skills only in the areas of obstetrics and gynecology (2).

Training in and evaluation of office and outpatient procedural skills are of particular importance in family practice for several reasons. First, there is an increasing desire by the government, insurance companies, and patients for procedures to be done on an outpatient basis. Such procedures not only reduce health care costs but also avoid the inconvenience of a hospital stay for the patient (3). It is essential that family physicians in rural areas be well trained in office and outpatient procedures, since other specialists are not always readily available for referral and the nearest hospital may be many miles away.

Second, office procedures, such as those listed in Table 1, are reimbursed at an hourly rate from six to 10 times higher than cognitive skills that might be used in a routine office visit. The income from performing procedures is an important source of office revenue.

Third, although many procedures can be safely performed in an office setting, even relatively common procedures, such as proctosigmoidoscopic examinations and casting of simple fractures, can be associated with significant morbidity if not performed correctly. Training and supervised experience in such procedures are mandatory during the residency program. Such training should include instruction in the proper utilization of facilities, equipment, and assistants.

Finally, documentation of a resident's ability to perform certain procedures may be useful in obtaining hospital privileges. Many procedures that can be done on an outpatient basis are frequently listed on hospital privilege request forms, and residency program directors may be asked to certify a resident's competency to perform such procedures.

Method

Spivey developed a technique for using a formal survey to determine curriculum content (4). He stated, "One basic assumption of this technique is that many individuals, representing multiple backgrounds and viewpoints, and not just the teachers of a discipline, should be consulted to determine content." His tech-

nique of surveying qualified individuals to determine what they consider to be the minimum abilities acceptable has been used in developing and evaluating undergraduate medical curriculum (5) as well as in measuring the adequacy of various aspects of family practice residency programs (6, 7). Spivey's method has also been successfully applied in determining which procedural skills (both inpatient and outpatient) should be learned by internal medicine residents (8, 9). In these studies by Wigton and Steinmann, a core of procedural skills was identified that can be used for the training and evaluation of internal medicine residents.

The questionnaire used in the present study, conducted in 1982, was based on Spivey's technique and was developed in three stages. First, a list of office and outpatient procedural skills was compiled from (*a*) informal discussions with faculty members and residents in the University of Iowa Family Practice Residency Program, (*b*) personal experience of one of the authors (L.G.H.), (*c*) Iowa City area hospital privilege request forms, and (*d*) the literature (8–10). A preliminary list of about 70 items was then reviewed by the authors with University of Iowa family practice faculty members and residents and reduced to 40 basic or essential procedures (Table 1). Most of the items eliminated were felt to be either primarily inpatient or antiquated procedures. Several items not generally considered procedures (for example, interpretation of Gram's stains, electrocardiograms, chest x-rays, cultures) were included because they were felt to be items that residents could be expected to learn during residency.

In the second stage, the questions to be asked of faculty members, residency program graduates, and current residents were developed. One question common to the questionnaires for the faculty, residency program graduates, and current residents was, "Should a graduate family practice resident be able to perform this procedure?" In addition, faculty members were asked: "Are residents taught this procedure by direct supervision during residency?" "Have you directly supervised residents performing this procedure?" Graduates of the residency program were asked: "Were you adequately trained to perform this procedure by the time you left your residency?" "Do you perform this procedure now in your practice?" Residents were asked: "Have you been directly supervised during residency while performing this procedure?" "Do you feel competent to perform this procedure independently?" For these questions, possible responses were limited to "yes" or "no."

A final question requiring a "yes" or "no" response was asked of all survey participants: "Do you feel residents should be evaluated by direct observation of their performance of the above procedures?" Space was left at the end of each questionnaire for the respondent to suggest other procedures and to add comments.

The questionnaires were sent to a survey population consisting of all full-time clinical faculty members, residency program graduates, and current residents at the nine family practice residency training programs in Iowa. Those not responding to the initial mailing were sent an identical questionnaire approximately four weeks later. Questionnaires were returned by 34 of 35 faculty (97 percent), 131 of 157 residents (83 percent), and 236 of 266 residency program graduates (89 percent) for a total response rate of 88 percent (401 returned).

TABLE 1

Percentage of Affirmative Responses by 34 Clinical Faculty Members, 236 Residency Program Graduates, and 131 Current Residents at Nine Family Practice Residency Training Programs in Iowa to Question on Whether Graduate of Family Practice Program Should Be Able To Perform Selected Procedures, 1982

Procedure	Faculty	Graduates	Residents	Overall
Core				
Fluorescein eye examination/foreign body removal	100	100	100	100
Repair and closure of lacerations	100	100	100	100
Cerumen removal from ear	100	100	100	100
Electrosurgical or cryosurgical destruction of skin lesions	100	100	100	100
Incision and drainage of abscesses	100	100	100	100
Control of nasal hemorrhage	100	100	100	100
Proctosigmoidoscopic examination	100	100	100	100
Pelvic examination	100	100	100	100
Pap smear	100	100	100	100
Diaphragm fitting	100	100	100	100
Venipuncture	100	100	100	100
Reduction and casting of simple fractures	100	100	99	100*
Removal of ingrown toenail	100	100*	100	100*
Chest x-ray interpretation	100	100*	100	100*
Skin biopsy (shave, punch, or excisional)	100	100	99	100*
Wet mount potassium hydroxide preparation of vaginal discharge	100	100*	99	100*
Electrocardiogram interpretation	100	99	100	100*
Intrauterine device insertion	97	99	100	99
Microscopic examination of urine	100	99	99	99
Tonometry (Schiötz)	100	98	99	99
Joint aspiration and injection	100	97	100	98
Indirect laryngoscopy	100	98	96	98
Gram's stain of sputum and interpretation	97	94	100	97
Spirometry and interpretation	100	96	96	97
Suprapubic tap on infant	97	95	99	96
Injection of trigger points	100	97	94	96
Aspiration of breast mass	100	94	95	95
Excision of external thrombosed hemorrhoids	100	91	92	92
Preparation and interpretation of cultures (urine, throat)	94	92	91	92
Noncore				
Endometrial biopsy	100	89	91	91
Proctosigmoidoscopic examination with biopsy or polypectomy	94	90	87	89
Cervical (uterine) biopsy	97	89	84	88
Peripheral blood smear preparation and interpretation	94	83	94	87
Vasectomy	91	87	83	86
Audiometry and interpretation	85	84	77	82
Injection or ligation of internal hemorrhoids	78	76	83	79
Treadmill stress-testing and interpretation of results	83	75	75	76
Myringotomy	61	67	77	70
Split thickness skin graft	67	67	59	65
Lymph node biopsy	69	58	60	60

* Indicates value rounded to 100 percent.

Results and Discussion

The data obtained from the survey were analyzed to determine whether there was a consensus among the faculty members, residency program graduates, and current residents as to which of the 40 procedures they felt were important for residents to learn.

CORE PROCEDURES

For each of the 40 procedures, Table 1 gives the responses of each of the three groups to the question, "Should a graduate family practice resident be able to perform this procedure?" There were 13 procedures in which 100 percent of the faculty, residency graduates, and current residents agreed program graduates should be proficient. There were 16 additional procedures for which more than 90 percent of each of the three groups were in agreement that program graduates should be able to perform. This group of 29 "core" procedures, shown in Table 1, represents a minimal set of office and outpatient procedures that those surveyed felt family practice residents should be able to perform upon graduation from their residency. Many of the procedures that did not receive at least a 90 percent agreement rate among all three groups tended to be associated with greater potential morbidity.

SUPERVISION

Table 2 shows the responses of 45 third-year residents to the question of whether or not they had been directly supervised during residency while performing each procedure. Also in Table 2, the authors list the responses of faculty members as to whether residents were taught each procedure by direct supervision during their residency and whether they themselves had directly supervised residents performing each procedure. There was generally a large discrepancy between the residents' reports of the amount of direct supervision and the faculty members' reports that residents were supervised during the residency in performing these procedures. For all cases except suprapubic taps on infants, proctosigmoidoscopic examinations, chest x-ray interpretation, and electrocardiogram interpretation, the percentages indicated that the surveyed faculty members believed that the residents were being supervised to a greater extent than the residents reported they were being supervised.

There was also a considerable difference between the responses concerning whether the faculty members had personally supervised the residents in a particular procedure and whether the faculty members believed the residents were taught the procedure by direct supervision during the residency. Apparently the faculty members believe that supervision of the residents performing these procedures was occurring to a large extent outside the family practice offices, perhaps on specialty rotations. This, however, appears to be an erroneous assumption due to the number of third-year residents who felt they had not been directly supervised in many of these procedures.

COMPETENCE AND SUPERVISION

The authors sought to answer the question of whether there was any relation between the supervision a resident received while performing a procedure and his competency to perform the procedure independently. For residents in each year of training, their mean responses were analyzed for the two questions: "Have you been directly supervised during residency while performing this procedure?" "Do you feel competent to perform this procedure independently?" With minor

TABLE 2

Percentage of Affirmative Responses by 45 Third-Year Residents and 34 Clinical Faculty Members at Nine Family Practice Residency Training Programs in Iowa to Questions Dealing with the Supervision of Residents Performing Office and Outpatient Procedures, 1982

Procedure	Resident Response to Question on Direct Supervision*	Faculty Response	
		Taught by Direct Supervision†	Personal Supervision‡
Fluorescein eye examination/foreign body removal	77	100	82
Repair and closure of lacerations	95	100	94
Cerumen removal from ear	66	90	75
Electrosurgical or cryosurgical destruction of skin lesions	93	100	94
Incision and drainage of abscesses	95	100	91
Control of nasal hemorrhage	69	90	59
Proctosigmoidoscopic examination	100	100	94
Pelvic examination	91	97	88
Pap smear	82	94	81
Diaphragm fitting	77	100	81
Venipuncture	73	79	69
Reduction and casting of simple fractures	91	100	84
Removal of ingrown toenail	79	100	78
Chest x-ray interpretation	100	100	87
Skin biopsy (shave, punch, or excisional)	91	97	84
Wet mount/potassium hydroxide preparation of vaginal discharge	82	90	81
Electrocardiogram interpretation	100	100	84
Intrauterine device insertion	79	100	80
Microscopic examination of urine	77	86	67
Tonometry (Schiötz)	73	96	69
Joint aspiration and injection	78	100	88
Indirect laryngoscopy	71	90	41
Gram's stain of sputum and interpretation	61	89	44
Spirometry and interpretation	75	85	59
Suprapubic tap on infant	82	81	31
Injection of trigger points	64	90	66
Aspiration of breast mass	53	88	44
Excision of external thrombosed hemorrhoids	49	93	81
Preparation and interpretation of cultures (urine, throat)	55	74	44
Endometrial biopsy	50	89	39
Proctosigmoidoscopic examination with biopsy or polypectomy	49	90	47
Cervical (uterine) biopsy	39	85	34
Peripheral blood smear preparation and interpretation	48	70	28
Vasectomy	75	97	47
Audiometry and interpretation	39	71	31
Injection or ligation of internal hemorrhoids	30	56	25
Treadmill stress-testing and interpretation of results	64	71	12
Myringotomy	29	42	19
Split thickness skin graft	36	71	25
Lymph node biopsy	29	56	28

* "Have you been directly supervised during residency while performing this procedure?"

† "Are residents taught this procedure by direct supervision during residency?"

‡ "Have you directly supervised residents performing this procedure?"

exceptions reported below, each level of residents reported a progressively higher percentage of having been supervised in doing the procedures. The mean positive response to this question was 42 percent for first-year residents, 60 percent for second-year residents, and 68 percent for third-year residents. The residents reported a similar trend in their competency to perform these procedures independently; the mean positive response rate was 57 percent for first-year residents, 68 percent for second-year residents, and 79 percent for third-year residents. While the percentage of residents claiming competency was significantly greater ($p < .007$) than the percentage who reported having been supervised, there was a direct positive correlation (ranging from 0.823 to 0.887, $p < .001$) between the percentage of residents at each level who reported having been directly supervised and the percentage who felt competent to perform the procedure. This correlation, however, did not establish a causal link between supervision and competence.

Two further points can be made from these data. First, there were several procedures (fluorescein eye examination, repair of lacerations, cerumen removal, pelvic examination, Pap smear, venipuncture, and wet mount/potassium hydroxide preparation of vaginal discharge) for which the percentage of residents reporting competence was much higher than the percentage who had been supervised during residency. These core procedures were probably learned in medical school. Second, third-year residents indicated that for four procedures (split thickness skin graft, proctosigmoidoscopic examination with biopsy or polypectomy, vasectomy, and treadmill stress-testing and interpretation of results) the percentage who had been supervised was higher than the percentage who felt competent to perform the procedure.

A comparison was made of the percentage of third-year residents who felt competent to perform each procedure with the percentage who felt a residency program graduate should be able to perform the procedure. For slightly more than half of the procedures (21 of 40), more than 90 percent of the third-year residents indicated competence, and all of these 21 procedures were on the list of 29 core procedures.

More disturbing, however, was that less than 90 percent of the graduating residents felt competent in the remaining 19 procedures listed. For the following core procedures, the percent of third-year residents reporting competency ranged from 60 to 89 percent: joint aspiration and injection, injection of trigger points, control of nasal hemorrhage, excision of external thrombosed hemorrhoids, aspiration of breast mass, spirometry and interpretation, Gram's stain of sputum and interpretation, and preparation and interpretation of cultures (urine, throat). Thus, there were a large number of third-year residents who did not feel as well trained as they would like to be for many of these procedures.

How did the perceptions of competency in the third-year residents compare with the retrospective opinions of graduates as to whether they had been adequately trained in these procedures by the time they left their residency training? For 26 of the 29 core procedures, the value of the self-ratings of third-year residents was equal to or higher than those of the graduates. The mean differences, however, were not statistically significant. For all the noncore procedures, except injection or ligation of internal hemorrhoids, the graduates claimed to have achieved a higher level of skill during their residency training than that level reported by the third-year residents.

More than 80 percent of the graduates

reported that they were currently performing the core procedures. The core procedures performed least commonly in practice were cultures (75 percent), spirometry (68 percent), Gram's stain (65 percent), and suprapubic tap (64 percent).

PROCEDURAL TRAINING AND USE

Comparisons were made of skills at graduation ("Were you adequately trained to perform this procedure by the time you left your residency?") with their use in current practice ("Do you perform this procedure now in your practice?"). For 33 of the 40 skills, there was a strong positive correlation ($p < .01$) between the graduates' responses to these two questions. This indicates that a residency program graduate is unlikely to perform a procedure in practice if he feels he was not adequately trained in that procedure during residency. For each of the 11 noncore items, there was a significant positive correlation ($p < .01$) between having the skill at graduation and using it in the graduate's practice. This was also true of the 13 lowest-ranked core items. Residents who had mastered these skills by the time they graduated were more likely to use them in their practices than if the skills had not been mastered.

OBSERVATION AND EVALUATION

The respondents strongly felt that residents should be evaluated by direct observation of their performance of the procedures. The "yes" responses to the question were 100 percent by the faculty, 98 percent by residency program graduates, and 86 percent by current residents. By year of residency training, the percentage of "yes" responses increased from 77 percent in the first year to 83 percent in the second year to 95 percent in the third year. The overall percentage of respondents who felt that residents should be evaluated by direct observation was 94 percent. These results, together with written comments from residents on the questionnaire, indicated that the residents were willing to undergo evaluation in their performance of the procedures and saw the lack of such evaluation as a residency program weakness. The results also showed the increasing recognition of the usefulness of such evaluation by residents as they progress through their training.

Over half of the respondents supplied additional remarks on resident evaluation. Most of the remarks associated with a "yes" response to the question of evaluation emphasized that direct observation of residents performing procedures was the only logical and adequate way these techniques could be evaluated. Educators should, the residents said, teach the procedures more purposely and directly by giving immediate constructive feedback in order to correct errors and help refine the resident's technique.

Comments made by those who felt evaluation was not necessary generally indicated that the evaluation process would involve too much "red tape" or that, while supervision might be appropriate, evaluation was not. Some residents felt that they had had enough evaluation in medical school.

Summary

In brief, there were seven major results of this study:

1. There was a set of 29 office and outpatient procedures which responding faculty members, residency program graduates, and current residents strongly agreed a graduating resident should be able to perform.

2. Faculty members believed residents were taught procedures by direct supervision to a much greater extent than the residents reported they were actually supervised.

3. Faculty members believed that they

did not do most of the supervising of residents performing these procedures.

4. There was a positive correlation between the percentage of residents who had been supervised and the percentage who felt competent to perform each procedure; this was especially true for the more complex procedures.

5. There were several procedures which residents nearing graduation felt they should be able to perform but did not feel competent to perform.

6. The residency graduates were less likely to perform in their practices those office and outpatient procedures in which they had not been adequately trained than those in which they feel competent.

7. Faculty members, residency program graduates, and residents overwhelmingly agreed that residents should be evaluated by direct observation of their performance of office and outpatient procedures.

Conclusions and Recommendations

Three limitations should be considered in interpreting the results of this study: (*a*) although the graduates who were studied were practicing in several states, the study has limited geographic generalizability; (*b*) the study was one of perceptions of what is important; and (*c*) no cognitive measures of knowledge about procedures were used.

Training in office and outpatient procedural skills should be a formal part of a family practice residency program curriculum. The list of 29 core procedures should be seriously considered as part of the list of required procedures for programs. The remaining noncore procedures, which are more complicated, could then form an elective group of procedures the resident might choose to learn if he so desired.

More extensive training in office and outpatient procedures in these programs should be provided than is presently done. Some of these procedural skills can be taught initially through the use of patient simulators, such as the latex colon for sigmoidoscopy or pigs' feet for suturing (11), or by "patient instructors" who have been used successfully for teaching pelvic and rectal examinations (12). The use of simulators, however, is never a substitute for performing the procedures on actual patients, and the use of professional patients is limited to very few procedures.

The family practice clinical faculty members must assume greater responsibility for the supervision of residents in their performance of the desired procedures than they presently do. Both faculty members and residents agree that such supervision is necessary, although it is not always clearly accomplished. This lack of intense supervision by family practice clinical faculty members may be the result of a mistaken impression that residents are being supervised by other specialists in their performance of office and outpatient procedures. On the other hand, residents, while performing these procedures, should be more active in seeking supervision from the clinical faculty members in the family practice offices. Residents should not assume that they are performing a procedure correctly and would not benefit from further supervision because it is relatively simple or because it was done in medical school. Residents do, in fact, seem to be more willing to be supervised as they progress in their residency training.

Finally, a process should be established for assessing and documenting residents' performance of office and outpatient procedures. This evaluation would require more time, money, and effort than the evaluation of cognitive knowledge, since

it would require that faculty members observe the residents directly. These procedures, however, are an important part of a family physician's skills and should be evaluated in an effective manner. Neither this study nor any other study has provided evidence that direct observation creates a stressful or tense situation, interferes with the resident-patient relationship, or would for these reasons be resisted by residents (13, 14). Any stress introduced by the evaluation process can be reduced by focusing on the teaching of the procedure rather than on the evaluation per se, by having the residents involved in establishing the evaluation process for these procedures, and by providing prompt, constructive feedback to the resident as part of the training and evaluation process (13).

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DATAGRAM

Results of the NRMP for 1985

The number of U.S. seniors who enrolled in the National Resident Matching Program (NRMP) in 1985 increased by 49 from a year ago (1). The number who subsequently withdrew decreased by 59 (Table 1), and the number of active applicants increased by 108. The proportion who were unmatched decreased by 57 (0.4 percentage points).

The total number of U.S. and Canadian citizens (U.S. seniors, "fifth pathway" students, graduates of foreign medical schools [FMG], physician candidates [earlier U.S. graduates who are seeking an entering position in graduate medical education], and osteopathic and Canadian graduates) who applied to the match this year increased by only 5. Among the other U.S. and Canadian citizens, the number of fifth pathway applicants decreased from 425 to 407; 352 participated in the match, and 81 percent were successful.

The number of graduates of osteopathic schools who initially applied to the match increased by 52 percentage points to 631, a 1.5-fold increase since 1983; 59 percent were matched. The number of physician applicants increased only slightly, and 51 percent were successful in the match.

The number of FMG who applied decreased by 503. Of the 9,562 who applied, 2,619 were U.S. citizens; the number of U.S. FMG decreased by 10 percentage points, but the number unmatched increased by 4 percentage points to 60 percent. The number of alien FMG decreased by 3 percentage points, and the percentage unmatched remained at 78 percent.

The number of positions offered for the first postgraduate year increased by 78; 161 more were offered in the generalist* specialties than in 1984 (Table 2), an increase of 0.6 percentage points to 64.9 percent. The ratio of positions per initially-enrolled applicant was 0.7, that of positions per all U.S. senior and other U.S.-Canadian citizen applicant was 0.9, and that per U.S. senior was 1.14. The ratios for active applicants in the match were, respectively, 0.83, 1.02, and 1.25.

The overall filling of positions increased by 1 percentage point, the filling of positions by U.S. seniors by 0.2 percentage points, and the filling by other applicants by 0.8 percentage

TABLE 1

Participation in the National Resident Matching Program in 1985

Category	U.S. Senior Students		Other U.S. and Canadian Citizens*		Alien Foreign Graduates		Total Applicants	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Applicants	16,179	100.0	5,332	100.0	6,943	100.0	28,454	100.0
Withdrew	1,330	8.2	2,051	38.5	2,687	38.7	6,068	21.3
Active participants	14,849	91.8	3,281	61.5	4,256	61.3	22,386	78.7
Matched	13,753	92.6	1,635	49.8	918	21.6	16,306	72.8
Unmatched	1,096	7.4	1,646	50.2	3,338	78.4	6,080	27.2
Total	14,849	100.0	3,281	100.0	4,256	100.0	22,386	100.0

* Other U.S. and Canadian citizens include graduating students from U.S. osteopathic schools and Canadian medical schools; physician candidates, that is, earlier U.S. graduates who are seeking an entering position in graduate medical education; "fifth pathway" students, who are U.S. nationals who completed course requirements for a medical degree abroad followed by a year of clinical training in a U.S. hospital under medical school sponsorship; and U.S. foreign medical graduates.

* "Generalist" specialties are defined as family practice, internal medicine, obstetrics/gynecology, and pediatrics.

TABLE 2

Positions Offered and Filled by Specialty and Type of Applicants in the NRMP in 1985

Specialties	Positions Offered		Applicants Matched											
			U.S. Senior Students			Other U.S. and Canadian Citizens‡			Alien Foreign Graduates			Total Applicants		
	No.	Percent*	No.	Percent		No.	Percent		No.	Percent		No.	Percent	
				*	†		*	†		*	†		*	†
Family practice	2,372	12.8	1,626	11.8	68.5	232	14.2	9.8	40	4.4	1.7	1,898	11.6	80.0
Internal medicine	6,736	36.3	4,997	36.3	74.2	673	41.2	10.0	426	46.4	6.3	6,096	37.4	90.5
Pediatrics	1,899	10.2	1,287	9.4	67.8	190	11.6	10.0	213	23.2	11.2	1,690	10.4	89.0
Obstetrics/gynecology	1,021	5.5	828	6.0	81.1	128	7.8	12.5	13	1.4	1.3	969	5.9	94.9
Psychiatry	902	4.9	600	4.4	66.5	69	4.2	7.6	70	7.6	7.8	739	4.5	81.9
Medical specialties	91	0.5	63	0.5	69.2	3	0.2	3.3	1	0.1	1.1	67	0.4	73.6
Dermatology	5	0.0	5	0.0	100.0	0	0.0	0.0	0	0.0	0.0	5	0.0	100.0
Neurology	59	0.3	35	0.3	59.3	1	0.1	1.7	1	0.1	1.7	37	0.2	62.7
Ophthalmology	27	0.1	23	0.2	85.2	2	0.1	7.4	0	0.0	0.0	25	0.2	92.6
General surgery	2,310	12.5	1,862	13.5	80.6	155	9.5	6.7	36	3.9	1.6	2,053	12.6	88.9
Surgical specialties	530	2.9	461	3.4	87.0	45	2.8	8.5	3	0.3	0.6	509	3.1	96.0
Neurosurgery	35	0.2	29	0.2	82.9	2	0.1	5.7	0	0.0	0.0	31	0.2	88.6
Othopedics	329	1.8	287	2.1	87.2	37	2.3	11.2	1	0.1	0.3	325	2.0	98.8
Otolaryngology	46	0.2	39	0.3	84.8	0	0.0	0.0	1	0.1	2.2	40	0.2	87.0
Urology	112	0.6	100	0.7	89.3	6	0.4	5.4	1	0.1	0.9	107	0.7	95.5
Plastic surgery	8	0.0	6	0.0	75.0	0	0.0	0.0	0	0.0	0.0	6	0.0	75.0
Support specialties	1,468	7.9	1,057	7.7	72.0	79	4.8	5.4	63	6.9	4.3	1,199	7.4	81.7
Anesthesiology	375	2.0	339	2.5	90.4	9	0.6	2.4	1	0.1	0.3	349	2.1	93.1
Emergency medicine	234	1.3	221	1.6	94.4	9	0.6	3.8	2	0.2	0.9	232	1.4	99.1
Pathology	468	2.5	190	1.4	40.6	35	2.1	7.5	56	6.1	12.0	281	1.7	60.0
Physical medicine	87	0.5	62	0.5	71.3	7	0.4	8.0	4	0.4	4.6	73	0.4	83.9
Preventive medicine	6	0.0	3	0.0	50.0	0	0.0	0.0	0	0.0	0.0	3	0.0	50.0
Diagnostic radiology	263	1.4	219	1.6	83.3	17	1.0	6.5	0	0.0	0.0	236	1.4	89.7
Therapeutic radiology	33	0.2	23	0.2	69.7	2	0.1	6.1	0	0.0	0.0	25	0.2	75.8
Nuclear medicine	2	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Transitional	1,206	6.5	972	7.1	80.6	61	3.7	5.1	53	5.8	4.4	1,086	6.7	90.0
Total	18,535	100.0	13,753	100.0	74.2	1,635	100.0	8.8	918	100.0	5.0	16,306	100.0	89.0

* Percent distributions of positions offered and filled among specialties (percentages may not add because of rounding).

† Percent of positions offered in specialty that were filled by applicants.

‡ See Table 1 footnote.

points. The most competitive programs were in emergency medicine, obstetrics/gynecology, orthopedic surgery, otolaryngology, urology, and diagnostic radiology. The participation of programs and positions in orthopedic surgery and urology was essentially unchanged. The low number of positions in neurological surgery and otolaryngology is attributable to the withdrawal of many programs in order to participate in non-NRMP matches. Only a few programs in nuclear medicine and plastic surgery again participated in the match. The distribution of matched U.S. seniors among types of programs decreased slightly in family practice and the support specialties, and the percentage of the class entering internal medicine and psychiatry increased slightly.

Advanced Programs for Students positions were again offered in the match this year. Twenty programs offered 44 positions in psychiatry and in the medical, surgical, and support specialties. The number of applications was small, and seven students were matched to them. Five students were also matched to programs they sought for the first postgraduate year.

For the second year, couples were not allowed to withdraw from the match to accept positions outside the match, and a paired-choice algorithm was used. This change resulted in the participation of 742 individuals as 371 couples; 90 percent of these U.S. students were successfully matched.

Several specialty matches for physician candidates were carried out by the NRMP in 1984. In the summer, 109 programs offered 248 positions for fellowships in respiratory disease; 217 physicians were matched to 88 percent of these positions. In the fall, 24 programs offered 46 positions in colon and rectal surgery, and 93 percent were filled. Late in the fall, 32 programs in emergency medicine offered 198 positions; 98 percent of them were filled with 194 physician applicants. In the first specialty match for dermatology last fall, there were 479 applicants for 202 positions; a total of 200 physicians were matched to fill 99 percent of the positions.

Data that describe the trends in numbers of positions offered and filled by U.S. seniors and other applicants during the past several years are included in one of the NRMP's annual directories (2).

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